I. General Information

CAS Number:	107-87-9
Name:	2-Pentanone
	Ethyl acetone
	Methyl propyl ketone
	Methyl-n-propyl ketone
	Methylpropyl ketone
	MPK

II. Physical-Chemical Data

A. Melting Point

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Not Specified
GLP:	Unknown
Year:	Unknown
Remarks:	
Results	
Melting point value:	-78 °C
Kcmarks:	
Data Quality	
Remarks:	Data obtained from Hazardous Substances Data Bank Number: 158
References	Budavari, S. (Ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Whitehouse Station, NJ: Merck and Co., Inc 1996, 1043
Other	Last revision date: 1999092 1

B. Boiling Point

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Not specified
GLP:	Unknown
Year:	Unknown
Remarks:	
Results	
Boiling point value:	101.7 ^{o}C
Pressure:	Not specified
Data Quality	
Remarks:	Data obtained from Hazardous Substances Data Bank Number: 158
References	Lewis, R.J., Sr. (Ed.). Hawley's Condensed Chemical Dictionary. 12th ed., New York, NY: VanNostrand Rheinhold Co., 1993, 779.
Other	Last revision date: 19990921

C. Vapor Pressure

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Not specified
GLP:	Unknown
Year:	Unknown
Remarks:	
Results	
Vapor pressure value:	35.4 mmHg
Temperature:	25 ^{o}C
Remarks:	
Data Quality	
Remarks:	Data obtained from Hazardous Substances Data Bank Number: 158
References	Riddick, J.A., *et al*.; Techniques of Chemistry 4th ed., Volume II. Organic Solvents. New York, NY: John Wiley and Sons, 1985.
Other	Last revision date: 19990921

D. Partition Coefficient

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Not specified
GLP:	Unknown
Year:	Unknown
Remarks:	
Results	
Log P_{OW}:	0.91
Temperature:	Unknown
Remarks:	
Data Quality	
Remarks:	Data obtained from Hazardous Substances Data Bank Number: 158
References	Hansch, C., Leo, A., and Hoekman. D.; Exploring QSAR – Hydrophobic, Electronic, and Steric Constants. Washington, DC: American Chemical Society; 1995, 14.
Other	Last revision date: 19990921

E. Water Solubility

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Not specified
GLP:	Unknown
Year:	Unknown
Remarks:	
Results	
Value:	43 g/L
Temperature:	25 ^{o}C
Description:	Moderate (10-100 g/L)
Remarks:	
Data Quality	
Remarks:	Data obtained from Hazardous Substances Data Bank Number: 158
References	Yalkosky, S.H., Dannenfelser, R.M.; The AQUALSOL dATAbASE of Aqueous Solubility. 5th ed., Tucson, AZ: Univ. Az, College of Pharmacy, 1992.
Other	Last revision date: 19990921

III. Environmental Fate Endpoints

A. Photodegradation

Test Substance	
Test substance:	MPK
Remarks:	
Method	
Method:	Unknown
Test type:	Reaction with OH radicals
GLP:	No
Remarks:	
Results	
Conc. of substance:	Unknown
Temperature:	25 ^{o}C
Rate constant:	4.9 x 10^{-12} cm^3/molecule-sec
Half-life:	79-Hours (based on an average atmospheric hydroxyl radical concentration of 5 x 10^5 molecules/cm^3)
Remarks:	
Conclusions	Material is slowly degraded by atmospheric hydroxyl radicals.
Data Quality	
Remarks:	Data obtained from Hazardous Substances Data Bank Number: 158
References	Atkinson, R.; *J. Phys. Chem. Reference Data,* 1989.
Other	Last revision date: 19990921 The results from the EPIWIN modeling program yielded a half-life of 26.88 hours based on a similar rate constant of 4.77 x 10^{-12} cm^3/molecule-sec and an average atmospheric hydroxyl radical concentration of 1.5 x 10^6 molecules/cm^3.

B. Stability in Water

Reactivity of Selected Ketones With Water

This report has been prepared Dr. Paul Worsham of Eastman Chemical to document the known chemistry relevant to the stability of selected ketones in aqueous solution. The specific ketones addressed in this document are methyl propyl ketone (MPK; CAS# 107879), methyl isopropyl ketone (MIPK; CAS# 563804), methyl isoamyl ketone (MIAK; CAS# 110123), and methyl n-amyl ketone (MAK; CAS#110430).

Of particular concern in the evaluation of the stability of organic compounds in aqueous solution is the potential for hydrolysis. Hydrolysis is the reaction between water and an organic substrate resulting in the cleavage of existing chemical bonds and subsequent or simultaneous formation of new chemical bonds to form a different chemical compound. Typically, hydrolysis reactions involve incorporation of a water molecule into the structure of the reaction products. For organic substances that participate in hydrolysis reactions, various kinetic methods can be used to monitor the changes in concentration of reactants and determine the rate of transformation of the original substrate into reaction products. OECD Guideline 111 describes one such procedure for measuring the hydrolysis rate of water-soluble substrates as a function of pH. Substrates that exhibit high rates of hydrolysis are considered unstable in an aqueous environment.

Ketones as a class, and specifically the ketones identified above, do not participate in hydrolysis reactions. These ketones do not possess labile leaving groups that can be displaced by the nucleophilic attack of a water molecule, as is required in the mechanism of many hydrolysis reactions. Thus, it would not be meaningful to attempt to measure a hydrolysis rate using a protocol such as OECD Guideline 111.

Certain ketones may add water to form a hydrate under aqueous conditions, especially in the presence of mild acid; but, this addition is an equilibrium reaction that is reversible upon a change in water concentration, and the reaction ultimately leads to no permanent change in the structure of the ketone substrate.[1, 2]

A significant property of most ketones is that the hydrogen atoms on the carbons next to the carbonyl group are relatively acidic when compared to hydrogen atoms in typical hydrocarbons. Under strongly basic conditions these hydrogen atoms may be abstracted to form an enolate anion. This property allows ketones, especially methyl ketones such as the four ketones above, to participate in condensation reactions with other ketones and aldehydes. This reaction is called an aldol reaction and generates a higher molecular weight ketone having a hydroxyl group at the site of attack by the enolate anion. This type of condensation reaction is favored by high substrate concentrations and high pH (greater than 1 wt% NaOH). It is conceivable that some alkyl ketones, especially methyl ketones, could participate in aldol reactions in dilute aqueous solution at pH of 9 or higher. But, these reactions would be expected to be slow at ambient temperature, and the equilibrium for condensation of two ketones is unfavorable for aldol product formation[3]. Also, formation of the aldol product is reversible unless dehydration of the aldol occurs. Dehydration of an aldol intermediate in aqueous solution at ambient temperature also would be very slow.

Based on the properties of ketones described above one must conclude that MPK, MIPK, MIAK, and MAK are not subject to hydrolysis, but may participate in other transformations that convert the ketone to higher molecular weight compounds. These reactions would be expected to be very slow at mild temperatures and moderate pH. Therefore, it is my conclusion that MPK, MIPK, MIAK, and MAK should be considered stable in aqueous solution at temperatures and pH levels relevant to environmental and human exposure.

References:

(1) Bell and Clunie, *Trans. Faraday Soc.*, **48,** 439, (1952).
(2) Cohn and Urey, *J. Am. Chem. Soc.*, **60**, 679 (1938).
(3) March, J., ed. "Advanced Organic Chemistry", 3rd edition, p. 831, John Wiley & Sons, New York, 1985.

C. Biodegradation

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Degradation; Method is similar to OECD: TG-301C: Modified MITI Test.
Test type:	Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)
GLP:	No (PreGLP)
Year:	1974
Remarks:	BOD was determined after 5 and 20 days.
Results	
Results:	BOD5 was 1.38 grams BOD/gram of test substance BOD20 was 1.8 grams BOD/gram of test substance COD was 1.8 grams oxygen/gram of test substance
Remarks:	
Conclusions	The test material is considered to be "Readily Biodegradable" based on a BOD5/COD ratio greater than 0.5. (1.38/1.8 = 0.77)
Data Quality	
Remarks:	While the detail from the referenced report is relatively scant, it is notable to point out that this study was conducted by a very reputable company with an established history of conducting this type of study.
References	Data are in report "Basic Toxicity of Methyl Propyl Ketone" Health, Safety and Human Factors Laboratory, Eastman Kodak Company, Rochester, NY; HS&HFL No. 74-305.
Other	

Test Substance	
Test substance:	MPK
Remarks:	Purity was 99.7%
Method	
Method:	OECD TG-301D
Test type:	Ready Biodegradability by the Closed Bottle Method
GLP:	Yes
Year:	2001
Contact time:	28-Days
Inoculum:	Activated sludge collected from Wareham, MA wastewater treatment plant
Remarks:	Benzoic acid at 10 mg/ml was used as a reference control. MPK was assessed at a nominal concentration of 2.5 mg/L. Test vessels of 300ml BOD bottles were prepared per treatment (reference, test substance and inoculum blank), two each for Day 0 and three per sampling interval (Days 7, 14, 21, and 28). After the bottles were filled they were closed and wrapped in tin foil.
Results	
Degradation % at test end:	70% (>60% by Day 14)
Classification:	Readily biodegradable
Remarks:	Benzoic acid reference was degraded 72%. The temperature of the environment ranged from 20-22 ^{o}C. Dissolved oxygen concentrations in the control blank ranged from 8.7 mg/L on Day 0 to 7.1 mg/L on Day 28. The protocol stated that oxygen depletion in the controls should not exceed 1.5 mg/L loss before Day 28; however, the loss was 1.6 mg/L. This protocol deviation was viewed as minor and does not affect the overall conclusion as it occurred well after Day 14 when the material had already met the ready biodegradable pass level of >60%.
Conclusions	Material is considered readily biodegradable under the conditions of this test.
Data Quality	
Remarks:	This was a well-documented study that followed established guidelines and was conducted under GLP assurances.
References	Methyl Propyl Ketone – Ready Biodegradability by the Closed Bottle Method; Springborn Laboratories, Inc Wareham, MA Study No. 1852.6174.
Other	

D. Transport between Environmental Compartments (Fugacity)

Test Substance	
Test substance:	MPK
Remarks:	
Method	
Test type:	Estimation
Model used:	Level III Fugacity Model; EPIWIN:EQC from Syracuse Research Corporation
Remarks:	
Results	
Model data and results:	Concentration (%)
Estimated distribution and media concentration (levels II/III):	Air 8.69 Water 50.5 Soil 40.7 Sediment 0.0651
Remarks:	Physical chemical values utilized in this model were default values obtained from the EPIWIN program.
Data Quality	
Remarks:	
References	Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 1.2, Syracuse Research Corporation, Syracuse, New York 13210. The Level III model incorporated into EPIWIN is a Syracuse Research Corporation adaptation of the methodology described by Mackay *et al*. 1996; *Environ. Toxicol. Chem.* **15(9)**, 1618-1626 and *Environ. Toxicol. Chem.* **15(9)**, 1627-1637.
Other	

IV. Ecotoxicity

A. Acute Toxicity to Fish

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Other
Test type:	Static
GLP:	No
Year:	1975
Species/strain:	Fathead minnow (*Pimephales promelas*)
Analytical monitoring:	Yes; Exposure solutions, temperature, pH, dissolved oxygen
Exposure period:	96-Hour
Remarks:	Water was filter-treated lake water with residual chlorine chemically removed. Twenty fish per dose level were used. Exposure solutions were submitted for temperature, dissolved oxygen, and pH concentration determinations at 0, 24, 48, 72, and 96 hrs. Observations for stress and mortality were conducted at 0, 0.5, 1, 6, 24, 48, 72, and 96 hours.
Results	
Nominal concentration:	100 and 1000 mg/L
Endpoint value:	LC_{50} >1000 mg/L; NOEC > 1000 mg/L
Biological observations:	No behavioral abnormalities were noted at any dose.
Statistical Methods:	NA; no effects were noted at any concentration
Remarks:	Exposure temperature ranged from 18-20 ^{o}C, pH was 7.6-8.0, and dissolved oxygen was 4.7-8.6 mg/L.
Conclusions	The LC_{50} value indicates that the test substance would not be classified according to the European Union's labeling directive and would correspond to a "low concern level" according to the U.S. EPA's assessment criteria.
Data Quality	
Reliability:	Reliable with restrictions
Remarks:	Study lacked some basic information as well as data indicating test material purity and analytical conformation of test concentrations.
References	An Acute Aquatic Effects Test with the Fathead Minnow; Environmental Sciences Section, Health and Environment Laboratories, at Eastman Kodak Company, Rochester, NY. HAEL No. 74-0305.
Other	

B. Acute Toxicity to Aquatic Invertebrates

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Other
Test type:	Acute immobilization
GLP:	No
Year:	1975
Species/strain:	*Daphnia magna*
Analytical monitoring:	Yes; Exposure solutions, temperature, pH, dissolved oxygen
Exposure period:	96-Hour; static exposure
Remarks:	Water was filter-treated lake water with residual chlorine chemically removed. Twenty Daphnid per dose level were used. Exposure solutions were submitted for temperature, dissolved oxygen, and pH concentration determinations at 0, 24, 48, 72, and 96 hrs. Observations for stress and immobility were conducted at 0, ½, 1, 6, 24, 48, 72, and 96 hours.
Results	
Nominal concentration:	100 and 1000 mg/L
Endpoint value:	LC_{50} >1000 mg/L; NOEC > 1000 mg/L
Biological observations:	No behavioral abnormalities were noted at any dose.
Statistical Methods:	NA; no effects were noted at any concentration
Remarks:	Exposure temperature ranged from 18-20 ^{o}C, pH was 7.6-8.0, and dissolved oxygen was 4.7-8.6 mg/L.
Conclusions	The LC_{50} value indicates that the test substance would not be classified according to the European Union's labeling directive and would correspond to a "low concern level" according to the U.S. EPA's assessment criteria.
Data Quality	
Reliability:	Reliable with restrictions
Remarks:	Study lacked some basic information as well as data indicating test material purity and analytical conformation of test concentrations.
References	An Acute Aquatic Effects Test with the Daphnid (*Daphnia magna*); Environmental Sciences Section, Health and Environment Laboratories, at Eastman Kodak Company, Rochester, NY. HAEL No. 74-0305.
Other	

C. Toxicity to Aquatic Plants

Test Substance	
Test substance:	MPK
Remarks:	Purity was 99.8%
Method	
Method:	OECD: TG-201
Test type:	Growth inhibition of algae
GLP:	Yes
Year:	1998
Species/strain:	*Selenastrum capricornutum*
Endpoint basis:	Cell concentrations (biomass) and growth rate
Exposure period:	72-hours
Analytical procedures:	Temperature, light intensity, rpm, and test substance concentration were assessed at the 0, 24, 48, and 72 hours. The pH was assessed at time 0 and after 72 hours.
Remarks:	The concentration of algae at Day 0 was 10^4 cells/ml.
Results	
Nominal concentration:	0, 15.6, 31.2, 62.5, 125, 250 mg/L
Measured concentration:	0, 9.27, 17.81, 35.98, 73.77, 150.27 mg/L (geometric mean)
Endpoint value:	The estimated E_bC_{50} (0-72 hr) was 174.5 mg/L; the E_rC_{50} (0-72 hr) was 308.8 mg/L
NOEC, LOEC, or NOEL, LOEL:	The 72 hr NOEC was estimated to be 73.77 mg/L
Biological observations:	No deformed cells were noted
Was control response satisfactory:	Yes (a 110 fold increase in cell number was observed)
Statistical Methods:	Data were using descriptive statistics, plots, any applicable transformations, outlier tests, test for normality and heterogeneity of variance, regression techniques, the appropriate analysis of variance model (ANOVA) and Dunnett's test for comparison of treatment means to control.
Remarks:	A mean illumination of 743 foot-candles was maintained. The mean temperature was 24^oC and pH ranged from 7.48 to 7.72. Cultures were oscillated at 100 rpm. The significant loss (up to 71.1% over the course of the study) in test material was attributed to volatilization. No protocol deviations were noted.
Conclusions	The 72-hour E_bC_{50} and E_rC_{50} values indicate that, based on this study, the test substance would not be classified as "harmful to aquatic organisms" according to the European Union's labeling directive and would be classified in a "moderate concern level" according to the U.S. EPA's assessment criteria.
Data Quality	
Reliability:	Reliable without restrictions
Remarks:	This was a well-documented OECD-study conducted under GLP assurances
References	A Growth Inhibition Test with the Alga, *Selenastrum capricornum*; Environmental Sciences Section, Health and Environment Laboratories, Eastman Kodak Company, Rochester, NY; Study No. EN-512-901928-A; August 27, 1999
Other	

V. Toxicological Data

A. Acute Toxicity

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Acute lethality; Other
Test type:	LD_{50} estimate
GLP:	No (Pre-GLP)
Year:	1974
Species/strain:	Rats
Sex:	Males
Animals/sex/dose:	2/dose
Vehicle:	None used
Route of exposure:	Oral gavage
Remarks:	Following an overnight fast, rats (2/dose) weighing 140-169 g were administered 200, 400, 800, 1600, or 3200 mg/kg test material. Following exposure animals were observed 14-days for clinical signs.
Results	
Value:	LD_{50} = 1600-3200 mg/kg
Deaths at each dose:	200 – 1600 mg/kg: No Mortalities 3200 mg/kg: Both rats died.
Remarks:	Immediately after dosing, the 200 mg/kg group showed slight weakness, while the 400 and 800 mg/kg dose groups were described as moderately to quite weak. The 1600 and 3200 mg/kg groups of animals were described as very weak and ataxic. Several hours after dosing, the 200, 400 and 800 mg/kg animals were slightly, moderately, or quite weak. The 1600 mg/kg animals had rough hair-coats and were very weak. Approximately 4.5 hours after dosing, one of the 3200 mg/kg animals died. The remaining rat was described as prostrate on the day of dosing and was found dead the following morning. All other animals survived the observation period and gained weight. No necropsies were conducted.
Conclusions	Material is considered slightly toxic (0.5 - 5 g/kg)
Data Quality	
Reliability:	Reliable with restrictions
Remarks:	Basic data are given
References	Study was conducted at Laboratory of Industrial Medicine, Eastman Kodak Company. Rochester, NY. Reference No. 74-305.
Other	

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Acute lethality; Other
Test type:	LD_{50} estimate
GLP:	No (Pre-GLP)
Year:	1974
Species/strain:	Mice
Sex:	Males
Animals/sex/dose:	2/dose
Vehicle:	None used
Route of exposure:	Oral gavage
Remarks:	Following an overnight fast, rats (2/dose) weighing 25-27 g were administered 200, 400, 800, 1600, or 3200 mg/kg test material. Following exposure animals were observed 14-days for clinical signs.
Results	
Value:	LD_{50} = 1600-3200 mg/kg
Deaths at each dose:	200 - 800 mg/kg: No deaths occurred 1600 and 3200 mg/kg: One at each level
Remarks:	Immediately after dosing, animals in the 200, 400 and 800 mg/kg dose groups were slightly weak. The 1600 and 3200 mg/kg groups of animals were described as quite weak or prostrate. One of the 3200 mg/kg animals died approximately 1.3 hours after dosing. By several hours after dosing, one of two 1600 mg/kg animals was prostrate; all other surviving animals were slightly weak. The animal that had been prostrate remained very weak and did not eat on Day 1; this animal died on Day 6. All other animals survived a fourteen-day observation period and maintained or gained weight. No necropsies were conducted.
Conclusions	Material is considered slightly toxic (0.5 - 5 g/kg)
Data Quality	
Reliability:	Reliable with restrictions
Remarks:	Basic data are given
References	Study was conducted at Laboratory of Industrial Medicine, Eastman Kodak Company. Rochester, NY. Reference No. 74-305
Other	

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Other
Test type:	Acute lethality estimate
GLP:	No (preGLP)
Year:	1962
Species/strain:	Rat/Charworth Wistar
Sex:	Unknown
Animals/sex/dose:	6
Vehicle:	None
Route of exposure:	Inhalation
Remarks:	Animals are exposed to vapor-air mixture generated by passing 2.5 L/min of dried air at room temperature through a fritted glass disc immersed at least one inch into test material contained in a gas-washing bottle. Inhalations are continued for time periods in a logarithmic series with a ratio of two extending from 15 minutes to 8 hours, until the inhalation period killing half the number of rats within 14 days is defined. Concentrations recorded are nominal.
Results	
Value:	LC_{50} 2000-4000 ppm (4-hours)
Deaths at each dose:	2000 ppm (0.5 hours): 0 of 6 died 2000 ppm (4 hours): 1 of 6 died 4000 ppm (4 hours): 6 of 6 died
Remarks:	
Conclusions	
Data Quality	
Reliability:	Reliable with restrictions
Remarks:	The manuscript in which this value was published lacked detail regarding the test material, methodologies, and description of clinical observations. Nevertheless, for the purpose of assessing acute lethality potential the data should be deemed reliable enough.
References	Smyth, H.F., Jr., Carpenter, C.P., Weil, C.S., Pozzani, U.C., and Striegel, J.A. Range-Finding Toxicity Data: List VI. *Industrial Hygiene Journal* March-April, 95-107, 1962.
Other	

B. Repeated Dose Toxicity

Test Substance	
Test substance:	MPK
Remarks:	Purity >97%
Method	
Method:	Other
Test type:	Repeated exposure
GLP:	No (PreGLP)
Year:	1978
Species/strain:	Rat/COBS CD (SD) BR
Route of exposure:	Oral; drinking water
Duration of test:	10-13 Months
Dose levels:	0.25% (10-months); 0.5% and 1.0% (13-months).
Sex:	Male (10/dose)
Exposure period:	Continuous in drinking water
Control group and treatment:	Yes, water absent test-article
Post-exposure observation period:	No
Remarks:	Animals (226-240 g) were housed singly in wire bottom cages and fed *ad libitum*. Drinking water containing test-compound was measured every other day to determine exposure. Animals were observed daily with body weight determinations and a neurological examination performed weekly. At termination animals were divided into two groups and processed for routine histological examination or underwent special fixation procedures for examination of nervous system tissues. The only organs weighed were the liver, kidney, and testes while microscopic examination was performed on 35 different organs or tissues. Clinical chemistries and hematological parameters were not assessed. In addition, only males were exposed.
Results	
NOEL:	0.5% (250 mg/kg)
Actual doses received:	Mean daily dose levels of 144, 250, and 454 mg/kg.
Toxic responses by dose:	Three animals died during study, one control, and one mid-dose and one from the high-dose level. The high-dose animal was euthanized due to a severe respiratory infection while the other treated animal died spontaneously from a massive renal hemorrhage. A slight decrease (maximum of 9% at Day 298) in body weight was seen at the 1.0% level. There was no clinical or histological evidence of neurotoxicity exhibited by any of the treated animals. There was no effect on organ weights or lesions noted in any of the other many tissues microscopically evaluated.
Statistical Methods:	Not described in report
Remarks:	
Conclusions	Animals appeared to tolerate exposure to MPK with minimal effects.

Data Quality	
Reliability:	Reliable with restrictions
Remarks:	This study was conducted before GLP assurances were enacted and lacked an assessment of other important parameters such as clinical chemistries and a second sex. Nevertheless, it was still a fairly well documented study and had an exposure period of between 10-13 months.
References	A Comparative Chronic Toxicity Study of Methyl n-Propyl Ketone, Methyl n-Butyl Ketone and Hexane. Health, Safety, and Human Factors Laboratory, at Eastman Kodak Company, Rochester, NY. August 14, 1978.
Other	

Test Substance	
Test substance:	MPK
Remarks:	Purity unknown
Method	
Method:	Other
Test type:	Repeated exposure to assess neurotoxic potential
GLP:	No (PreGLP)
Year:	1977
Species/strain:	Rat/Charles River CD
Route of exposure:	Inhalation
Duration of test:	17.5 weeks
Exposure levels:	305 ppm (1,074 mg/m^3)
Sex:	Male (5/dose)
Exposure period:	Two 16-hour periods and two 20-hour periods on 4 consecutive days
Control group and treatment:	Yes, air
Post-exposure observation period:	No
Remarks:	The main objective of this study was to assess the potential of MPK to induce neurotoxicity. Methyl n-butyl ketone was used as a positive control. In addition to special fixation of nervous tissue, 23 other tissues were harvested and processed in a routine manner for histological examination.
Results	
NOAEL:	305 ppm (1,074 mg/m^3)
Actual doses received:	Not reported
Toxic responses by dose:	There was no clinical signs or histological evidence of neurotoxicity exhibited by any of the MPK-treated animals. A very slight enlargement of hepatocytes was noted in one animal. This was the only effect noted that was deemed to have been possibly related to MPK exposure in any of the tissues microscopically evaluated.
Statistical Methods:	Not described in report
Remarks:	
Conclusions	Animals appeared to tolerate exposure to MPK with minimal effects.
Data Quality	
Reliability:	Reliable with restriction
Remarks:	The report from this study was deficient in both the detail of the methodology used and results. However, it does present data from a long-term inhalation exposure indicating this compound did not induce evidence of neurotoxicity.
References	Report TL-77-50; Health, Safety, and Human Factors Laboratory, at Eastman Kodak Company, Rochester, NY. February 21, 1977.
Other	

C. Genetic Toxicity - Mutation

Test Substance	
Test substance:	MPK
Remarks:	Purity was 95%
Method	
Method:	EEC Annex V Guideline number B.14 and B.13 (OECD:TG-471-like)
Test type:	*In vitro* mutagenicity
GLP:	Yes
Year:	1999
Species/strain:	*Salmonella typhimurium*/TA98, 100, 1535, 1537, and *Escherichia coli*/WP2*uvr*A(pKM101)
Metabolic activation:	Yes; Aroclor 1254-induced SD rat liver S9
Concentration tested:	Maximum concentration tested was 5000 ug/plate
Remarks:	Positive controls (2-aminoanthracene, 2-nitrofluorene, sodium azide, ICR-191, and 4-nitroquinoline-N-oxide) were run concurrently. Water was used as a vehicle control.
Results	
Result:	No positive responses were induced in any of the tester strains
Cytotoxic concentration:	>5000 ug/plate (no evidence of cytotoxicity was seen)
Precipitation concentration:	No precipitate was observed at the highest concentration tested.
Genotoxic effects	
With activation:	Negative
Without activation:	Negative
Statistical Methods:	Mean number of revertants and standard deviations were calculated. Various criteria were established to constitute a valid assay and a positive response was indicated by a 2-3 fold increase in mean revertant number dependent on the bacterial tester strain.
Remarks:	
Conclusions	Material was not genotoxic under conditions of this assay.
Data Quality	
Reliability:	Reliable without restrictions
Remarks:	This was a well-documented OECD guideline study conducted under GLP assurances.
References	Covance Laboratories Inc., Vienna, VA; Study No.: 20219-0-409R; March 8, 1999
Other	

D. Genetic Toxicity – Chromosomal Aberrations

Test Substance	
Test substance:	MPK
Remarks:	Purity was 95% (Lot No.:12-98)
Method	
Method:	OECD: TG-473
Test type:	*In vitro* mammalian chromosomal aberrations assay
GLP:	Yes
Year:	1999
Species/strain:	Chinese hamster ovary cells (CHO)
Concentrations tested:	Up to 900 ug/ml (this level exceeds the 10 mM max. recommended level)
Metabolic Activation:	Aroclor 1254-induced SD rat liver S9
Remarks:	The positive controls consisted of mitomycin-C and cyclophosphamide. Negative control was water.
Results	
Result:	No significant increases in cells with chromosomal aberrations, polyploidy, or endoreduplication were observed on analyzed cultures.
Cytotoxic concentration:	>1200 ug/ml (no evidence of cytotoxicity was seen)
Precipitation concentration:	No precipitate was observed at maximum concentration tested.
Genotoxic effects	
With activation:	Negative
Without activation:	Negative
Statistical Methods:	Statistical analysis employed a Cochran-Armitage test for linear trends and Fisher's Exact Test to compare the percentage of cells with aberrations.
Remarks:	
Conclusions	Material was not genotoxic under conditions of this assay.
Data Quality	
Reliability:	Reliable without restrictions
Remarks:	This was a well-documented OECD guideline study conducted under GLP assurances.
References	Covance Laboratories Inc., Vienna, VA; Study No.: 20216-0-437OECD; April 30, 1999
Other	

E. Developmental Toxicity

Test Substance	
Test substance:	MPK
Remarks:	Purity was >99%
Method	
Method:	OECD:TG-421
GLP:	Yes
Year:	1999
Species/strain:	Rats/Sprague-Dawley
Sex:	Male and Female (12/dose)
Route of exposure:	Inhalation, whole-body
Exposure levels:	0, 1, 2.5, or 5.0 mg/L
Actual exposure levels:	0, 1, 2.5, or 5.0 mg/L
Exposure period:	6 hrs/day
Frequency of treatment:	7 days/week
Control group and treatment:	Controls were treated and housed similarly
Duration of test:	Males were exposed for 51 days while females were exposed for 35 to 48 days. In addition to traditional female and fetal parameters and indices of toxicity, sperm, obtained from the epididymis on day of necropsy, was analyzed for motility. In addition testicular and epididymal sperm counts were conducted using an automated sperm analyzer.
Remarks:	
Results	
Maternal toxicity NOEL:	2.5 mg/L
Repro./Develop. toxicity NOEL:	>5.0 mg/L
Parental toxic responses:	There were no mortalities. A dose responsive reduction in activity was noted during the exposure period in the high-dose animals only. There was no effect on food consumption or body weight in either sex. There were no effects noted in any of the litter parameters due to MPK exposure (reproductive performance, gestation length, number of live/dead pups, implant total, prenatal loss, % survival, ratio of male/female pups, or pup weight). There were no effects noted in either sex on any of the selected organs that were weighed, or examined grossly or histologically. An increase in the mean absolute, but not body weight relative, epididymis weight was noted in the animals given 5 mg/L.
Fetal toxic responses dose:	There were no treatment-induced changes in pup clinical signs or abnormalities, or weight gains at any measured time-period.
Statistical Methods:	Mean values were calculated and assessed for homogeneity of variance using Bartlett's test followed by ANOVA and either Duncan's multiple range test or Dunnett's t-test. Non-homogeneous data were evaluated using Kruskal-Wallis H-test followed by Mann-Whitney U-test. Reproductive performance was evaluated in contingency table using Chi-square test.
Remarks:	
Conclusions	Test material did not induce any evidence of reproductive or developmental toxicity under the conditions of this assay.

Data Quality	
Reliability:	Reliable without restriction
Remarks:	This was a well-documented OECD guideline study conducted under GLP assurances.
References	Reproduction/Developmental Toxicity Screening Test in the Rat. Toxicological Sciences Laboratory, Health and Environment Laboratories, Eastman Kodak Company, Rochester, NY; Study Number HAEL 99-0201; October 6, 1999.
Other	

F. Toxicity to Reproduction

See robust summary E above which was a combined developmental/reproductive toxicity screening assessment.